

Claims:

1. A receiver for recovering data for at least one of a plurality of users from contemporaneously detected like modulated radio signals generated by said users from user data in combination with a plurality of user specific codes, said receiver comprising

5 - a plurality of data detector means (24, 24') each of which is operatively associated with one of the plurality of the user specific codes and one of a plurality temporal displacements with respect to an impulse response of a communications channel through which the radio signals have passed, each of said data detector means (24, 24')

10 operating to estimate symbols of said data for one of said users from said received radio signals in combination with said user specific spreading code and said temporal displacement,

 - a signal strength estimation means (26) which operates to determine a relative strength of the received radio signals from which each of said user data symbols was

15 estimated by said data detectors, and

 - a receiver controller (30) which operates to assign said user codes and said temporal displacements to each of said data detectors (24, 24'), wherein said receiver controller (30) operates to re-assign said plurality of spreading codes and said temporal displacements to said data detectors (24, 24') consequent upon said relative strength of

20 said radio signals, thereby facilitating recovery of data symbols for said at least one user.

characterised in

said receiver controller (30) operates to assign said user specific codes to said plurality of data detectors (24, 24') to the effect that a different number of said data detectors (24, 24') are assigned the same user specific spreading code and different temporal displacements for a user having a relatively weak signal strength than for a user having a relatively strong signal strength.

2. A receiver as claimed in Claim 1, wherein said receiver controller (30) operates to assign said user specific codes to said plurality of data detectors (24, 24') to the effect that more of said data detectors (24, 24') are assigned the same user specific spreading code and different temporal displacements for a user having a relatively weak signal strength than for a user having a relatively strong signal strength.

3. A receiver as claimed in Claim 1, wherein said receiver controller (30) operates to assign said user specific codes to said plurality of data detectors (24, 24') to the effect that more of said data detectors (24, 24') are assigned the same user specific spreading code and different temporal displacements for a user having a relatively strong signal strength than for a user having a relatively weak signal strength.

4. A receiver as claimed in Claim 1, and further comprising a signal re-generator means (32) coupled to said data detector means (24, 24') which operates to re-generate said received signals associated with at least one user, by combining said estimated user data symbols with said one of said plurality of user specific codes in dependence upon one

of said temporal displacements, wherein said data detectors (24, 24') further include means (38) for subtracting said regenerated signals from said received signals, prior to estimation of said user data symbols.

5 5. A receiver as claimed in any preceding claim and further including a combiner means (28) coupled to said plurality of data detector means (24, 24') and arranged to combine said estimated symbols associated with the same user to form composite symbol decisions to recover the data for the user.

10 6. A receiver as claimed in any preceding claim, and further including
- a data store (22) which serves to store said radio signals received within a pre-determined time window, which stored radio signals are iteratively fed to said data detectors (24, 24') under control of said receiver controller (30).

15 7. A receiver as claimed in any preceding claim, wherein the data detector means are rake fingers (24, 24'), the user specific codes being spreading codes, the radio signals from the plurality of users being generated in accordance with code division multiple access.

20 8. A receiver as claimed in any preceding claim, wherein said signal strength estimator means (26) further operates to estimate the strength of components of said radio signals received at said temporal displacements, and said receiver controller (30) further

operates to re-assign said plurality of data detectors in accordance with said relative strength of said signal components.

9. A method of recovering data for at least one of a plurality of users from contemporaneously detected like modulated radio signals generated from user data and a plurality of user specific codes, said method comprising the steps of;

- processing said radio signals with a plurality of data detector means so as to estimate data symbols associated with a plurality of said users at a plurality of temporal displacements with respect to an impulse response of a communications channel through which said received signals have passed;

- determining a relative strength of the radio signals from which each of said user data symbols were estimated; and

- re-assigning user specific codes and temporal displacements to said plurality of data detectors for at least one of said users in dependence upon the relative signal strengths of said radio signals

characterised in

that the re-assignment is carried out in such a way that a user with signals having a relatively weak signal strength is assigned a different number of said detectors than a user with signals having a relatively strong signal strength.

10. A method as claimed in Claim 9, characterised in

assigning more detectors to an user with signals having a relatively weak signal strength than a user with signals having a relatively strong signal strength.

11. A method as claimed in Claim 9, characterised in

5 assigning more detectors to an user with signals having a relatively strong signal strength than a user with signals having a relatively weak signal strength.

12. A method as claimed in any of Claims 9 to 11, and further including the steps of;

10 - storing said radio signals received within a pre-determined temporal window; and
- re-estimating said user data symbols for said re-assigned codes and temporal displacements from said stored radio signals, thereby providing an improved estimate of said user data symbols.

15 13. A method as claimed in Claim 12, and further including the step of

- further re-assigning said user specific codes and said temporal displacements in dependence upon said relative signals strengths and further re-estimating said user data symbols from said stored received radio signals, further detecting said user data symbols.

20 14. A method as claimed in any of Claims 9 to 11, and further including the step of;

- storing said radio signals received within a pre-determined temporal window;

- re-generating some of said radio signals from said estimated user data symbols
and said user specific spreading codes for at least one temporal displacement;

- subtracting said re-generated radio signals from said stored radio signals;

- for user data symbols not so far detected, re-assigning to said data detectors the
5 user specific codes of said not so far detected users and a plurality of said temporal
displacements; and

- estimating said not so far detected user data symbols using said data detectors.

15. A method as claimed in Claim 14, and further including the steps of;

10 - repeating the steps of regenerating radio signals for said detected user data
symbols and subtracting the regenerated radio signals from the stored radio signals;

- further re-assigning to said data detectors the user specific codes of said not so
far detected users and a plurality of said temporal displacements; and

- further estimating said not so far detected user data symbols.

16. A method as claimed in Claim 15, and further including the step of

- repeating the steps of claim 15 until the data symbols from all users have been
detected.

17. A method as claimed in any of claims 12 to 16, and further including the steps

of

- determining the relative strengths of components of said received signals at each of said plurality of temporal displacements; and
- assigning said temporal displacements to said plurality of data detectors in dependence upon the relative strength of said signal components.

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18. A method as claimed in any of claims 9 to 17, wherein said user specific codes are spreading codes, said radio signals being combined with said data in accordance with code division multiple access.